F/V *Alaskan Leader*
Cruise Report AL-94-02
Longline Survey of the Washington and Oregon Coasts
September 29-October 13, 1994

On October 13, 1994, the National Marine Fisheries Service, Alaska Fisheries Science Center (AFSC), completed a longline survey of sablefish (*Anoplopoma fimbria*) resources off the coasts of Washington and Oregon. The survey area extended from the Canada-U.S. border southward to Cape Blanco (lat. 42°50'N) (Figure 1). This survey was a trial extension of the AFSC'S series of longline surveys of the Gulf of Alaska and eastern Bering Sea that date back to 1979.

OBJECTIVES

1. Determine the abundance and size composition of commercially important longline-caught species along the upper continental slope of Washington and Oregon: sablefish, shortspine thornyhead (*Sebastolobus alascanus*), rougheye rockfish (*Sebastes aleutianus*), and shortraker rockfish (*Sebastes borealis*).

2. Determine the abundance and size composition of other groundfish species caught during the survey: Pacific cod (*Gadus macrocephalus*), Pacific halibut (*Hippoglossus stenolepis*), arrowtooth flounder (*Atheresthes stomias*), and grenadiers (Macrouridae).

VESSEL AND GEAR

Survey operations were conducted using the F/V *Alaskan Leader*, a chartered U.S. longline vessel. The 46 m (150 ft) vessel carried standard longline hauling gear and was equipped with radios, radars, GPS receivers, LORAN receivers, video and paper track plotters, a processing line, four sets of plate freezers, and refrigerated holds. Vessel personnel consisted of a captain, an engineer, a first mate, a cook, a steward, a quality-control technician, three fishermen, three processors, and four baiters.

Gear configuration followed the standard used for 1988-94 AFSC longline surveys in Alaska. Units of gear (skates) were 100 m (55 fm) long and contained 45 size 13/0 Mustad[1] circle hooks. Hooks were attached to 38 cm (15 in) gangions that were secured to beckets tied into the groundline at 2 m (6.5 ft) intervals. Five meters (16 ft) of groundline were left bare at each end. Gangions were constructed of medium lay #60 thread nylon, becket material was medium lay #72 thread nylon, and groundline was medium lay 9.5 mm (3/8 in) diameter nylon.

A set of gear consisted of a flag and buoy array at each end followed sequentially by a 9.5 mm diameter nylon buoyline, a 92 m (50 fm) section of 9.5 mm polypropylene floating line, a 16 kg (35 lb) piece of chain (to dampen the effect of wave surge on the buoyline), 92 m of 9.5 mm nylon, a 27 kg (60 lb) halibut anchor, and 366 m (200 fm) of 9.5 mm nylon. The groundline was weighted with 3.2 kg (7 lb) lead balls at the end of each skate. Hooks were hand baited with chopped squid (*Illex* spp.) at a rate of about 5.7 kg (12.5 lb) per 100 hooks. Squid heads and tentacles were not used for bait.

Total groundline set each day ranged from 18 to 20 km (9.7-10.8 nmi) long and contained 178-200 skates (8,010-9,000 hooks). Normally, two one-hundred-skate groundlines were set end to end at each station across the upper continental slope.

OPERATIONS

The Washington/Oregon leg of the survey began on September 28 in Seattle, Washington, and ended on October 13 in Seattle. Fourteen days were spent fishing, two days were spent traveling to and from the fishing grounds and another day was spent offloading gear. No days were lost to bad weather.

Survey Operations

Fourteen stations were sampled along the upper continental slope off the coasts of Washington, Oregon, and California at a rate of one station per day (Figure 1). Surveyed depths ranged from approximately 150 to 1,200 m, although at some stations depths less than 150 m or more than 1,200 m were sampled (Table 1).

[1] Citation of the above brand name does not constitute U.S. government endorsement.

The gear was set from shallow to deep and was retrieved in the same order, except on occasions when groundlines parted or sea conditions dictated that it be pulled from the opposite direction. Setting began about 0630 h PDT. Retrieval began about 0930 h and was completed by about 1800 h.

Data Collection

Catch data were recorded on a hand-held electronic data logger. During gear retrieval a scientist recorded the species of each hooked fish, the condition of each unoccupied hook (absent, broken, or tangled), and whether bait remained on unoccupied hooks. Time of day was recorded constantly from an internal clock. Depth was entered when the first and last skates came aboard, at the beginning of each fifth skate, and when crossing into a new depth interval (0-100 m, 101-200 m, 201-300 m, 301-400 m, 401-600 m, 601-800 m, 801-1,000 m and 1,001-1,200 m).

Length frequency data were collected with a bar code-based measuring board and a bar code reader/data storage device. Length was measured by depth interval for sablefish, Pacific cod, grenadiers, arrowtooth flounder, rockfish, and thornyheads. Lengths of sablefish and Pacific cod also were recorded by sex. Pacific halibut were counted and released at the rail without measuring. Catch and length frequency data were transferred to a computer and electronic backup media twice a day. Otoliths and length-weight data were collected from sablefish and approximately 200 shortspine thornyhead were tagged and injected with oxytetracycline for an age validation study.

As in previous surveys, the charter vessel was allowed to retain most of the catch once the scientific data were recorded.

RESULTS

Twenty-eight longline hauls (sets) were completed (Table 1). Sablefish was the most frequently caught species, followed by Pacific grenadier, spiny dogfish, giant grenadier, and shortspine thornyhead (Table 2). A total of 24,635 sablefish, with an estimated total round weight of 50,038 kg (110,314 lb), was taken during the survey (Table 3).

The mean catch rates for sablefish, averaged across all depths and adjusted for ineffective hooks, are presented in Figure 2. The highest mean catch rate occurred at Station 6, off the Columbia River. The lowest mean catch rates were observed at the southernmost two stations, off Cape Arago and Cape Blanco.

Sablefish catch rates, averaged across all stations, decreased with depth (Figure 3) from 11.4 fish/skate in depths less than 200 fm to 6.9 fish/skate in depths over 600 fm.

The size composition of sablefish was similar in depth strata shallower than 500 fm (Figure 4); mean lengths in strata 1-4 ranged from 56.4 to 57.8 cm. In waters deeper than 500 fm, sablefish tended to be slightly larger (mean length = 60.1 cm). The mean length of sablefish ranged from 53.4 to 60.3 cm with no apparent trend at stations 2-14 (Figure 5), but was slightly longer (64.6 cm) at the northernmost station.

This work represented the first such survey off the West Coast, so there is no prior data from this area with which to compare our results. We can compare them with those from the 1994 Gulf of Alaska longline survey, however. Overall catch rates (number of fish per skate) were similar in both areas (9.2 fish/skate in the Gulf of Alaska vs 9.6 fish/skate off the West Coast). The average weight of fish caught in the Gulf of Alaska was 3.5 kg, compared to an average of just over 2 kg off the West Coast. Whereas the highest catch rates off the West Coast were in shallow water, the highest Gulf of Alaska catch rates occurred in intermediate depths between 300 and 499 fm.

SCIENTIFIC PERSONNEL

September 28-October 13

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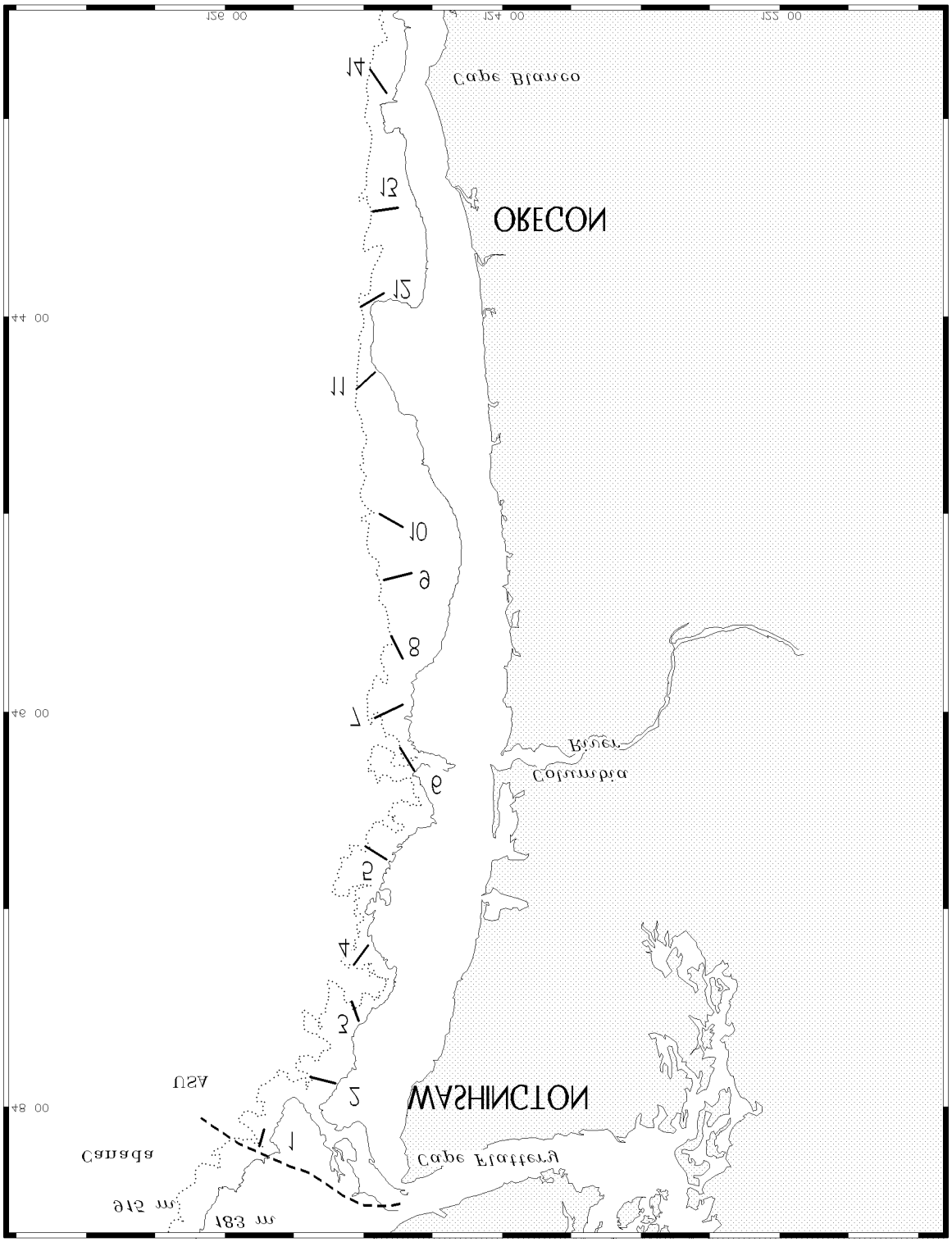

Figure 1.--Locations of stations fished by the *Alaskan Leader* during the 1994 National Marine Fisheries Service West Coast longline survey.